CLAIMS

What is claimed is:

1. A method for fabricating a magnetoresistive sensor comprising:
   a) providing a magnetoresistive structure including one or more ferromagnetic layers;
   b) disposing a mask between the magnetoresistive structure and an ion source, wherein the mask covers selected portions of the magnetorestive structure to define a sensor; and
   c) exposing one or more unmasked portions of the structure to ions to substantially reduce or eliminate a magnetoresistance of the unmasked portions substantially near room temperature while leaving the magnetoresistive structure substantially intact.

2. The method of claim 1, wherein the ions irradiate one or more ferromagnetic layers in the unmasked portions of the magnetoresistive structure.

3. The method of claim 1, wherein the ions are implanted into one or more ferromagnetic layers in the unmasked portions of the magnetoresistive structure.

4. The method of claim 1 wherein ferromagnetism of one or more ferromagnetic layers in the unmasked portions of the magnetoresistive structure is substantially reduced or eliminated, substantially near room temperature.

5. The method of claim 1 further comprising, prior to c), sputtering the unmasked portions, wherein

shadowing by the mask forms one or more tails, wherein the tails are exposed to ions in c).

6. The method of claim 1, wherein the mask is a contact photolithographic resist mask.

7. The method of claim 1, wherein the mask is a contact electron beam resist mask.

8. The method of claim 1, wherein the mask is a stencil mask.

9. The method of claim 1, wherein the ions are projected through a mask and focused onto the magnetoresistive structure.

10. The method of claim 1 allows widths of the magnetoresistive sensor between about 5nm and about 200nm.